PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Effects of yoga on wellbeing and healthy ageing: Study protocol for a randomized controlled trial (FitForAge).
AUTHORS	Östh, Josefine; Diwan, Vinod; Jirwe, Maria; Diwan, Vishal; Choudhary, Anita; Mahadik, Vijay Khanderao; Pascoe, Michaela; Hallgren, Mats

VERSION 1 - REVIEW

REVIEWER	Jitanan Laosiripisan Thammasat University, Thailand
REVIEW RETURNED	14-Nov-2018

GENERAL COMMENTS	The rationale for including an aerobic exercise group need to be clearly explained/ clarified. The reasons that were mentioned in page 16 "Here, the aerobic exercise group will match the yoga group on potential moderators such as the duration and location of activity, social contact and frequency of exercise" does not seem to fully explain why the study needs an aerobic exercise group. For example, if the authors concern about the location of activity, social contact the wait-list control group could be served as a "control" for this consideration (i.e., the participants in the wait-list control group will be asked to come to the fitness center and join a counselling session that does not include any physical activities.) Moreover, the yoga group will be asked to perform yoga at home at least once per week, if that is the case, the duration and frequency of exercise between two active/exercise groups (i.e., yoga, and aerobic exercise) is incomparable. (Page 9, line 27) “The trainer will give them advice on how to make this judgement around training intensity” need the clarification of how the trainer will advise the participants for the training intensity that they need to perform. The aerobic exercise includes more than one type (class) of exercise, what if the participants decide to participate only one class (i.e., light aerobic) and avoid the rest of the classes. What is the plan for this kind of situation? The intensity of aerobic exercise must be mentioned. The method to verify the intensity (e.g., Karvonen, or %HRmax) should be stated. Regarding post-intervention assessments, the effect of intervention as a long-term effect should be (re)assessment after completing the intervention(s) about 1-2 weeks. In Figure 1 (Study flow chart) shows that the follow-up assessment will be performed

	one week after completing the program (week 12+1) but in the main text (page 13, line 42) stated that the post-intervention assessments will be performed at 12 weeks.

REVIEWER	Palanimuthu T Sivakumar National Institute of Mental Health and Neurosciences, India
REVIEW RETURNED	27-Jan-2019

GENERAL COMMENTS	It is a well designed study evaluating the effect of Yoga intervention with aerobic exercise and waitlist control over 12 weeks with the primary outcome being subjective well-being. Authors have acknowledged the limitation of recruitment of healthy participants in the study that could have implications on generalisability to the general population. The exclusion criteria of uncontrolled diabetes and hypertension needs more clarity about any specific cut off and duration or number of measurements prior to recruitment. In view of diabetes and hypertension likely to be common particularly in sedentary elderly individuals, it may be appropriate to recruit them unless there is a very high levels of blood pressure and blood glucose that would increase the likelihood of patient being very sick or require interventions like initiation of insulin. Mildly uncontrolled blood pressure and diabetes need not be an exclusion criteria. In the study flow chart, it may be appropriate to refer Physical disability and severe cognitive deficit like dementia to describe the study methodology more clearly. The study methodology does not clearly specify regarding the method of screening for severe cognitive deficit / dementia. It appears that the only cognitive test used is verbal fluency. It will have limitation in the assessment of those with severe cognitive impairment. It will be useful to consider a standard global measure with valid cut offs to decide about exclusion or inclusion based on cognitive deficit. Addenbrooke's Cognitive Evaluation or MOCA can be considered.

VERSION 1 – AUTHOR RESPONSE

Response to reviewer comments:

Reviewer 1:

1.1 The rationale for including an aerobic exercise group need to be clearly explained/clarified.

We thank expert Reviewer 1 for this suggestion. Aerobic exercise is a recommended physical activity for all adults, including old adults, and one of the main alternative forms of exercise. Inactive older people need to decide what type of exercise they will do, and practitioners need to know which type to recommend. Our trial could help inform these decisions by making a head to head comparison. This is mentioned in the rationale, page 5, line 15: “While aerobic exercise is recommended for the prevention of several NCD’s [7], yoga’s emphasis on flexibility and balance may help to reduce the risk of fall-related injuries..”, page 5, line 21; “While previous trials have compared the effects of yoga with non-active controls [36], none have compared the effects of yoga on subjective wellbeing to aerobic training and a non-active (wait-list) condition among older adults” and on page 17, line 4: “If

appropriately disseminated, study findings could inform both individual and clinical decisions around exercise prescription for older adults".

1.2 The reasons that were mentioned in page 16 "Here, the aerobic exercise group will match the yoga group on potential moderators such as the duration and location of activity, social contact and frequency of exercise" does not seem to fully explain why the study needs an aerobic exercise group. For example, if the authors concern about the location of activity, social contact the wait-list control group could be served as a "control" for this consideration (i.e., the participants in the wait-list control group will be asked to come to the fitness center and join a counselling session that does not include any physical activities.) Moreover, the yoga group will be asked to perform yoga at home at least once per week, if that is the case, the duration and frequency of exercise between two active/exercise groups (i.e., yoga, and aerobic exercise) is incomparable.

Thank you for this relevant comment, we agree that the choice of comparison arms could be made clearer. The participants in the two physical activity arms will be prompted to attend classes three times weekly, and if they cannot attend classes all three times, they will be asked to exercise at home. The participants in the aerobic group will receive the same information and will thus be comparable. On page 8, line 11 and page 9, line 10, respectively, we have clarified this with the following text: "If the participants cannot make it to the FC three times weekly, they will be prompted to exercise at home". Please also see our previous response (above).

1.3 (Page 9, line 27) "The trainer will give them advice on how to make this judgement around training intensity" need the clarification of how the trainer will advise the participants for the training intensity that they need to perform.

We thank Reviewer 1 for this relevant comment. We removed this sentence as it was unclear. The reason for the earlier description of advice on intensity, was to minimize the risk of injury resulted by too intense classes. All available classes will however be light to moderate and the PT will discuss this with each participant before starting to exercise. We have clarified this on page 10, line 7 with the following text: "The purpose of the PT meetings is to make the participants familiar with the FC, the booking system and to make an exercise plan for the 12 weeks taking into account the exercise and health status of each participant, and in order to minimize the risk of injury".

1.4 The aerobic exercise includes more than one type (class) of exercise, what if the participants decide to participate only one class (i.e., light aerobic) and avoid the rest of the classes. What is the plan for this kind of situation?

Thank you, we appreciate this observation. Here is our explanation: All available classes for this comparison arm will be aerobic classes in different formats, but a similar intensity. Thus, we expect the classes to be at the same metabolic equivalent (MET) level. Classes will also be registered electronically so that analyses of attended classes can also be performed (in addition to intention to treat analyses). This is specified on page 10, line 11: "Participants will complete a weekly exercise diary and attendance at the yoga and aerobic classes will be recorded electronically when participants enter the FC's".

1.5 The intensity of aerobic exercise must be mentioned. The method to verify the intensity (e.g., Karvonen, or %HRmax) should be stated.

Thank you for this important observation. We agree that exercise intensity is a relevant factor that could influence many study outcomes, and should (ideally) be measured objectively. Due to feasibility issues, this is not possible in the current study. As a compromise, we have included a measure of perceived exercise intensity – the Borg Rating of Perceived Exertion Scale. We have added a description of this on page 12, line 6: "(the) Borg rating of perceived exertion scale (RPE) will be used to assess exercise intensity [71]. It will be handed out to the participants in the two physical activity

arms at halftime (6 weeks after baseline), and completed immediately after three exercise sessions within one week".

1.6 Regarding post-intervention assessments, the effect of intervention as a long-term effect should be (re)assessment after completing the intervention(s) about 1-2 weeks. In Figure 1 (Study flow chart) shows that the follow-up assessment will be performed one week after completing the program (week 12+1) but in the main text (page 13, line 42) stated that the post-intervention assessments will be performed at 12 weeks.

Thank you, we appreciate this remark. It has been clarified in the main text, page 14, line 5 (12 weeks + 1 as the participants will exercise for 12 full weeks).

Reviewer 2:

2.1 It is a well designed study evaluating the effect of Yoga intervention with aerobic exercise and waitlist control over 12 weeks with the primary outcome being subjective well-being.

Thank you expert Reviewer 2 for your comment.

2.2 Authors have acknowledged the limitation of recruitment of healthy participants in the study that could have implications on generalisability to the general population.

Thank you Reviewer 2 for your comment.

2.3 The exclusion criteria of uncontrolled diabetes and hypertension needs more clarity about any specific cut off and duration or number of measurements prior to recruitment. In view of diabetes and hypertension likely to be common particularly in sedentary elderly individuals, it may be appropriate to recruit them unless there is a very high levels of blood pressure and blood glucose that would increase the likelihood of patient being very sick or require interventions like initiation of insulin. Mildly uncontrolled blood pressure and diabetes need not be an exclusion criteria.

We thank Reviewer 2 for this relevant comment. We will exclude those participants with high blood pressure/glucose that are detected and not prior known by the participant. These participants will be referred to their primary health care center. The cut-off for systolic blood pressure is set to ≥160 mmHg and ≥100 mmHg for diastolic (WHO & International Society of Hypertension, 2003 Statement on management of hypertension. Journal of Hypertension, 2003 (21); 1983-92). Blood pressure will be taken at two times in each arm to maintain the accuracy of the measurement. Please see these new clarifications on page 7, line 16.

Regarding blood glucose; participants with insulin-dependent diabetes will be excluded. Moreover, those having a fasting blood glucose of ≥5.6 will be advised to seek medical care (Standards of Medical Care in Diabetes. American Diabetes Association, Diabetes Care 2009 Jan; 32(Suppl 1):13-61) at their primary care centre but can still participate. Please see these new clarifications on page 7, line 14.

2.4 In the study flow chart, it may be appropriate to refer Physical disability and severe cognitive deficit like dementia to describe the study methodology more clearly.

Thank you, we appreciate this observation and have clarified this, please see the revised Flow chart (Figure 1).

2.5 The study methodology does not clearly specify regarding the method of screening for severe cognitive deficit / dementia. It appears that the only cognitive test used is verbal fluency. It will have limitation in the assessment of those with severe cognitive impairment. It will be useful to consider a

standard global measure with valid cut offs to decide about exclusion or inclusion based on cognitive deficit. Addenbrooke's Cognitive Evaluation or MOCA can be considered.

Thank you for your comment. In this study, we will not include participants with severe cognitive deficits, whom will be excluded at screening based on two questions: “Do you have troubles with your memory that affects your daily life?” and “Do you have a diagnosis for dementia?” Cognition will be assessed as a secondary outcome, using Verbal fluency. For this measurement, we are guided by the mean values in Tallberg et al. (2008), and will exclude those with values below 21.5 for F-A-S, 12.1 for animal fluency and 8.5 for verb fluency. We will not include another instrument at screening for assessing cognition, with the main reason being screening time and participant burden.

VERSION 2 – REVIEW

REVIEWER	Jitanan Laosiripisan Thammasat University, Thailand
REVIEW RETURNED	27-Mar-2019

GENERAL COMMENTS	Thank you for the clear point-by-point responses.